

## FURTHER OBSERVATIONS ON THE FIELD ECOLOGY OF RAJASTHAN BATS<sup>1</sup>

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Although some information on general activities, sex ratio, food, reproduction, fat deposition, winter lethargy etc. of some bats from Rajasthan and neighbouring areas are provided by Brosset (1962 a, b, c.), Prakash (1963), Khajuria (1965, 1971, 1975), Agrawal (1967), Sinha (1976 a, b; 1977) and Sinha and Advani (1976), nevertheless there is a big lacuna in our knowledge of ecology of bats from these areas.

During 1972-1976, I made extensive field surveys in Rajasthan and ecological data so obtained for 15 species have been checked with previous data and new findings are presented below for each species.

### Family PTEROPODIDAE

#### **Rousettus leschenaulti leschenaulti** (Desmarest)

The Fulvous fruit bat was obtained from dark, deserted rooms of an old monument at Gagaron-ka-kila (10 km. east of Jhalawar, Rajasthan) in a forested area. The size of colony in the Gagaron-ka-kila was about 1,000 exs. It was noticed in association with *Rhinopoma microphyllum kinneri* in Jhalawar (Rajasthan).

It was seen in the vicinity of bushes laden with ripe fruit at Jhalawar late in the night

and was captured in mist-net between mid night and 4 A.M. Many seeds of fruits were seen on the ground at its roosting place. Gut contents showed only brown thick liquid like substances from which it can be concluded that this bat takes only soft parts of fruits.

Several ectoparasites, ticks, mites and wingless fly (Nycteribidae, Diptera) were obtained from the body.

#### **Pteropus giganteus giganteus** (Brünnich)

This large fruit bat was not seen in the extreme arid part of Rajasthan due to nonavailability of large trees and scarcity of water but is known to occur at Jodhpur (Prakash 1963) in a garden on *Ficus* tree near a big tank. It is common in humid parts of Rajasthan where large trees are available. Colonies (size 100-1,000 exs.) on banyan (*Ficus bengalensis*), peepal (*Ficus religiosa*), tamarind (*Tamarindus indica*), neem (*Azadirachata indica*) and mango (*Mangifera indica*) were observed in various localities (viz. Pali, Jhunjhunu, Dungarpur, Bundi, Ajmer, Banswara and Jhalawar) in semiarid and humid parts of Rajasthan. Further this bat was found always near or in towns and villages near human habitation. It was not found in deep forest nor in temples or old buildings as mentioned by Sanderson (1969) for some other species of *Pteropus*.

Some ectoparasites, wingless fly (Nycteribiidae, Diptera), ticks and mites were obtained.

#### **Cynopterus sphinx sphinx** (Vahl)

The short-nosed fruit bat was found active

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in Banswara and Bundi (Rajasthan) immediately after dusk on guava trees in a garden.

Gut contents had only remains of unidentified material.

Some wingless flies (Nycteribiidae, Diptera) were obtained from this bat.

Family RHINOPOMATIDAE

**Rhinopoma microphyllum kinneari**  
Wroughton

Besides the desert (Prakash 1963), this bat was obtained from various localities (Sinha 1980) in semiarid and humid parts of Rajasthan. The colony (size varying from 25-500 exs.) was found in somewhat dark and uninhabited houses, temples, caverns and under ground man made tunnels.

Besides previous records (Prakash 1963) this bat was also found in association with *Hipposideros fulvus pallidus* (in Mandore tunnel, and Bhim Bharak cave near Jodhpur and in Jhalara-Patan fort near Jhalawar) and with *Rousettus l. leschenaulti* (in Gagaron-kakila near Jhalawar) in Rajasthan. It was also observed in pure colonies in various localities in Rajasthan (namely Malarna Dungan, Sawai Madhopur Dist.; Maroth village, Nagaur Dist.; and Ransi village, Jodhpur Dist.). It seems that this bat is often captured by birds and mammals as it was seen in the beak of a kite and a crow in Maroth village (Nagaur Dist.) and being carried by a cat in Malarna Dungan (Sawai Madhopur Dist.).

Several ectoparasites, e.g., wingless fly (Nycteribiidae, Diptera), bugs (Cimicidae), ticks and mites were collected from this bat.

Large quantities of the guano of this bat is collected by the local people every year and used as fertiliser. According to local people the guano is a good fertiliser especially for

chilli and onion.

**Rhinopoma hardwickei hardwickei** Gray

Prakash (1963) collected this bat from dark portions of ruins and the man-made caverns in arid parts of Rajasthan. Further it was collected from dark portions of deserted houses, temples, caves and tunnels in various places in semiarid and humid parts of Rajasthan by me (Sinha 1980). In comparison with *R. microphyllum kinneari* colonies of this bat were smaller, not exceeding 50.

Besides association with *Rhinolophus l. lepidus* (mentioned by Prakash 1963) it was observed with *R. microphyllum kinneari*, *Hipposideros fulvus pallidus* and *Taphozous k. kachhensis* in Bhim Bharak cave (Jodhpur), with *Taphozous p. perforatus* in a ruined house at Dungarpur, with *Pipistrellus minus* in a temple at Salawas and with *R. m. kinneari* in Surpura (both in Jodhpur Dist.), Jhalawar and Bundi.

Fat deposition appears to coincide with breeding and winter conditions (Sinha 1976b).

Some information on food and reproduction of this species collected from Rajasthan have already been reported by Sinha and Advani (1976).

Ticks and dipteran fly (Nycteribiidae) were obtained from the body.

Family EMBALLONURIDAE

**Taphozous perforatus perforatus** Geoffroy

Previously this bat was known only from arid parts of Rajasthan (Prakash 1963). I observed this bat in both arid and humid parts in deserted houses (Luni and Dungarpur) and under ground tunnel (Mandore). It is found in association with *Rhinopoma microphyllum kinneari* (Prakash 1963). The size of colony was small (1-5 exs.) in Rajasthan. This bat was seen to be very active in roosting place

even in day time and hence difficult to catch.

Winged dipteran fly (Streblidae) was obtained from its body.

**Taphozous longimanus longimanus** Hardwicke

The haunt of this bat is quite different from other species. Sinha (1976a) found it in hollows and crevices of peepal and banyan trees in Rajasthan. Brosset (1962a) describes similar habitat in Anand. The size of colony varies from 6-40 exs. It was as active during day time as *T. perforatus* and therefore very difficult to catch. It was never met in association with other bats. Brosset (1962a) also mentions that it does not tolerate other species.

Observations on food and reproduction are recorded by Sinha and Advani (1976).

Ticks, mites and bugs (Cimicidae) were found on this bat.

**Taphozous kachhensis kachhensis** Dobson

Like *Rhinopoma microphyllum kinneari*, this bat is common in Rajasthan. Prakash (1963) collected it only from Jodhpur. The present observation is based on the collections made from different localities by me (Sinha 1980) in arid as well as humid parts of Rajasthan. Its favourite habitats are cracks, crevices and holes in caves, old houses etc. Its colonies are usually small (4 to 5 exs.) but there are several such colonies in the same building.

Brosset (1962a) and Prakash (1963) have not mentioned its association with other bats. I observed this species in association with *Rhinopoma m. kinneari* and *Hipposideros fulvus pallidus* in Mandore tunnel, Bhim Bharak cave and Jhalara-Patan fort in Rajasthan.

Sinha and Advani (1976) found one female in advanced stage of pregnancy in the last week of September. A female obtained in the last week of July (24.vii.1976, Bhim Bharak cave, Jodhpur) had a suckling young

(forearm 53% of the mother; gular sac and pectoral pore well developed; body naked; head well furred; and eye open) in her arm. The female had the right horn of the uterus well swollen (width 5 mm) while the left horn had regressed (width 2 mm). A female collected in the last week of August (Jodhpur, 29.viii.1976) had early pregnancy. Brosset (1962 a) found pregnant females in June at Ahmedabad and towards end of August in Maharashtra. The present observation thus shows that this bat evidently breeds at least twice a year once in July-August and again in October. The female carrying a suckling young which had the right horn of the uterus swollen was obviously a case of post partum pregnancy as mentioned by Gopalakrishna (1955) in *Taphozous longimanus*.

Bugs (Cimicidae) and mites were found as ectoparasites.

Family MEGADERMATIDAE

**Megaderma Iyra Iyra** Geoffroy

Previously this bat was obtained by Prakash (1963) only from the Mandore nulla and Jodhpur fort (Jodhpur Dist.). It was observed and collected from a tunnel in the old mine (Nangal village, Jhunjhunu Dist.), a dark room in the Ranthambhore fort (Sawai Madhopur Dist.) and Dara fort (Kota Dist.), dungeon (Banswara, Banswara Dist.) and Jhalara Patan fort (Jhalawar Dist.). The colony size varies from 5-100 exs.

When approached the bat sometimes flies towards the intruder. It often flies low, sometimes touching the ground.

In Nangal (Jhunjhunu Dist., Rajasthan) it was found in association with *Rhinopoma m. kinneari* and *R. h. hardwickei*. Sexes may occur mixed or separately, and no regular sexual segregation was noted.

It harbours the winged fly (Streblidae, Diptera).

Family RHINOLOPHIDAE

**Rhinolophus lepidus lepidus** Blyth

Prakash. (1963) observed this bat in small numbers in a pit under the ceiling of a cavern at Bikaner and in a well at Pilani in arid part of Rajasthan. It was observed by me hanging from ceiling of dark temples in forested area (Sikar Burz, Bundi Dist. and Ranthambhore, Sawai Madhopur Dist.). When approached it did not fly out of the room but flew very fast inside the room as earlier reported by Prakash (1963). Only solitary bats were seen and no colony was found. It has not been observed in association with other bats either.

**Hipposideros fulvus pallidus** Andersen

Inhabits dark, abandoned rooms and tunnels around Jodhpur (a basement in a crowded suburb; a ruined building in a sparsely forested area; a rocky tunnel); also in an abandoned fort (Jhalara Patna).

It is very active in day time, and flies away on human approach. The flight is slow, low and fluttering.

It lives in small colonies not exceeding 25 exs. (generally 4-6), in which both sexes are found.

At Jhalawar it was found in association with *Megaderma l. lyra*, *Rhinopoma microphyllum kinneri* and *R. h. hardwickei* and in Jodhpur only with *R. h. hardwickei*.

Sinha and Advani (1976) have given some information on food of this bat in Rajasthan.

In July, at Jodhpur, a pair of infants were found, suggesting breeding in June. This is the sole information on breeding. [Brosset (1962b) who combined this species with *H. bicolor* recorded breeding of this 'complex' in April in Maharashtra].

Family MOLOSSIDAE

**Tadarida aegyptiaca thomasi** Wroughton

It was obtained from dark crevices and cracks in ceilings and walls and from narrow space between wall and notice board from various places in Rajasthan, viz. Rajgad fort (Ajmer Dist.) Kishorepura temple, Kota (Kota Dist.), Dungarpur Middle School (Dungarpur Dist.), ruined houses in Bundi (Bundi Dist.) and Jodhpur court (Jodhpur Dist.). The size of colonies varies from 5-20 exs., sometimes solitary individuals are also found.

Sinha and Advani (1976) have given some information on food and reproduction of this bat. Further, pregnant females collected in August in Jodhpur also support the birth of young in September as indicated by Sinha and Advani (loc. cit.) and Brosset (1962c).

Bugs (Cimicidae), ticks and mites were found as ectoparasites.

**Pipistrellus mimus mimus** Wroughton

This bat was obtained from cracks, crevices and holes in walls and ceilings of temple and houses in Jodhpur and Salawas (Jodhpur Dist.). The colony size varies from 12-50 exs.; a solitary bat was found hiding in a crack in an old house in Tonk (Tonk Dist.).

At Jodhpur, it starts flying in the evening about 20 minutes after sunset, and returns in the morning 15-20 minutes before sun rise. This bat and *P. dormeri* have been observed in Jodhpur in the same hunting territory exploring among old houses and trees.

Some information on food is given by Sinha and Advani (1976).

At Jodhpur, females with two sucklings young were found in August suggesting birth in August in Rajasthan. Sinha (1970) has reported female with suckling young in September from Calcutta.

**Pipistrellus dorneri** (Dobson)

This bat was observed in holes, cracks and crevices in ceilings and walls of old houses and temples at Dungarpur, Banswara and Jodhpur in Rajasthan and in holes of banyan trees (*Ficus bengalensis*) at Sukal Tirath (Bharoch Dist., Gujarat).

At Jodhpur, in summer it starts leaving the roost just after *Pipistrellus minus minus* (about 20 minutes after sunset). It was very active in the hunting territory up to 90 minutes after sunset and then disperses. It returns to the roost many times till it settles in finally before sunrise.

It was not found in association with other bats but observed in Surat, Gujarat in the same building in which other bats viz. *Cynopterus s. sphinx*, *Scotophilus h. heathi* and *T. k. kachhensis* live in different corners. Madhavan (1978) observed this bat often in association with other bats in Maharashtra.

There is no sexual segregation and both sexes are found in the same colony.

Pregnant females with one or two foetuses were found in July (early pregnancy) and September (advance pregnancy) in Jodhpur (Rajasthan). Madhavan (1978) mentions that this bat does not have sharply restricted breeding season but breeds throughout the year in Maharashtra.

Bugs (Cimicidae), ticks and mites are found

as ectoparasites.

**Scotophilus heathi heathi** Horsfield

This bat was obtained from cracks, crevices and holes in walls and ceilings of buildings from various localities in Rajasthan. At Sawai Madhopur it was also collected from a hole in banyan tree. The size of colony was generally not more than 10 exs. but in Banswara a colony of 25 exs. was seen.

As mentioned by Brosset (1962 c), in Rajasthan (Bundi) also two females were found in a state of torpor in a big hole of a wall on a very cold day of December.

Sexual segregation is not common, but in Bundi the two sexes were found in separate colonies.

Some observations on food have already mentioned by Sinha and Advani (1976).

Nothing is known about its breeding from Rajasthan.

Ticks, mites and insects (Diptera: winged Streblidae and wingless Nycteribiidae; Hemiptera: bugs of family Cimicidae) were collected from this bat.

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